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FULBRIGHT & JAWORSKI L.L.P.
600 CONGRESS AVE.
SUITE 2400
AUSTIN, TX 78701

EXAMINER	
LANGMAN, JONATHAN C	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/523,951	**Applicant(s)** SCHERER ET AL.	
	Examiner JONATHAN C. LANGMAN	**Art Unit** 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 22-67 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The applicant claims “obtaining a stabilized SiOxFy fluorine doped silica thin layer" and then teaches methods of depositions of SiO and metal oxide layers. It is unclear from the claims whether the top silica or metal oxide layer formed by sputtering or ion assisted deposition stabilizes the film or not. Could the film already be stabilized (i.e. through plasma treatment (see Bhan (US 6,001,728))? The claim may be more precise by stating "wherein the silica or metal oxide protective layer stabilizes the SiOxFy layer". This amendment would preclude already stabilized SiOF layers through plasma treatment etc. that would have subsequent deposition layers of metal oxides thereon, for either the art of antireflective coatings or semiconductor device manufacturing.

Furthermore it is unclear as to what “stabilized” means. The examiner could not find a definition of “stabilized” within the specification. From correspondence from the applicant it seems that stabilization may be measured by the dielectric layer over a period of time or the moisture content. However

what constitutes a film being stabilized? What is the definition of stabilization? To what degree of stabilization is claimed?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 47-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (EP 0975017 A2).

Regarding claim 47 and 54, EP teaches an antireflective coating comprising a substrate and a SiO capping layer disposed on a SiOF film ([0019]). Since the applicant teaches the same materials, the SiOF film is said to be "stabilized". It has been held that where the claimed and prior art products are identical or substantially identical in structure or are produced by identical or a substantially identical processes, a prima facie case of either anticipation or obviousness will be considered to have been established over functional limitations that stem from the claimed structure. *In re Best*, 195 USPQ 430, 433 (CCPA 1977), *In re Spada,* 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). The ***prima facie*** case can be rebutted by evidence showing that the prior art products do not necessarily posses the characteristics of the claimed products. *In re Best*, 195 USPQ 430, 433 (CCPA 1977). EP teaches that the SiO protective film is

deposited by PECVD and not by ion assisted or sputter deposition. However, these deposition techniques are product by process limitations. The structure of EP still has the same properties and layers as instantly claimed, the only difference between EP and the instant claims being process limitations. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Regarding claims 48-50, EP teaches that the silica cap layer can be up to 2000 nm [0060]. Thus overlapping the instantly claimed ranges.

Regarding claims 51-52, EP teaches that the SiOF layer has a thickness of 100nm-1000nm [0060]. Thus overlapping the instantly claimed ranges.

Regarding claim 53, although EP is silent to the refractive index of the layer, it is inherent, that the refractive index of the material at the given wavelength and time will be the same, since the materials and thicknesses of EP and the instant application are similar. See in re Best as applied above.

Claims 47-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Jang et al. (US. 6,165,915).

Regarding claim 47, Jang (US 6,165,915) teaches that dense Silicon dioxide is known in the art to (1) impede diffusion of fluorine containing species from within the (SiOF) layer, and (2), impedes moisture into the (SiOF) layers, thus stabilizing the underlying SiOF layer (col. 7, lines 5-20). Although Jang teaches PECVD as a preferred embodiment for depositing the barrier layer instead of sputtering or ion assisted deposition, the claim is written in product by process form, since Jang teaches stabilization of SiOF through the use of SiO, it is the Examiners position that the deposition methods instantly claimed do not structurally change the article. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Regarding claim 53, although Jang et al. is silent to the refractive index of the layer, it is inherent, that the refractive index of the material at the given wavelength and time will be the same, since the materials and thicknesses of EP and the instant application are similar.

Regarding claims 54, the stack as described above is formed on a semiconductor substrate and inherently has antireflective properties (abstract).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 22-30, 33, and 47-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (EP 0975017 A2) in view of Machol (US 5,719,705).

Regarding claims 22 and 47, EP teaches semiconductor devices on a wafer substrate comprising a fluorine doped silicon layer (FSG) on which is disposed a dielectric silicon dioxide layer cap layer and a SiON layer (Lee, [0030]). EP go on to teach that the silica dielectric capping layer is deposited by PECVD and CVD [0002]. The PECVD of EP utilizes ion bombardment (by definition) however is silent to the use of depositing with an ion gun. Machol et al. teaches well known deposition techniques of silicon oxide layers in the art. The methods of Machol et al. teach that silicon dioxide layers can be deposited

by many techniques known in the art. These techniques include CVD, IBAD, and sputtering, the sputtering technique may use a sputtered metal layer on a substrate and thereafter expose the metal layer to a reactive gas (e.g. oxygen), to form a metal oxide, other techniques include PECVD, and ion bombardment assisted deposition col. 6, line 50 – col. 7, lines 40). It would have been obvious to utilize any known deposition technique in the art to deposit the metal oxide layer of EP. Machol is relied upon for the known techniques of deposition in the art, it would have been obvious to a routineer in the art to utilize any known technique of deposition of metal oxides, including those instantly listed in claims 22 and 47. The layer of silicon oxide on the SiOF layer is said to protect the underlying layer to some degree.

Regarding claims 23-25 and 48-50 EP teach that the silica cap layer can be up to 2000 nm [0060]. Thus overlapping the instantly claimed ranges.

Regarding claim 26, Machol et al. teach that oxygen is used as a gas to form the layers of SiO_2 (col. 7, lines 5-10).

Regarding claims 27 Machol et al. teach the deposition of the SiO_2 layer by commonly known practices of IBAD which utilizes argon gas as the ionizing gas for the ion gun (col. 8, lines 50-55).

Regarding claims 28, 29, 51, and 52 EP teach that the FSG layer is 100-1000 nm thick [0060]. Thus overlapping the instantly claimed ranges.

Regarding claims 30 and 53, although EP is silent to the refractive index of the layer, it is inherent, that the refractive index of the material at the given

wavelength and time will be the same, since the materials and thicknesses of EP and the instant application are similar.

Regarding claims 33 and 54, the stack as described above is formed on a semiconductor substrate and has antireflective properties (abstract).

Claims 30, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (EP 0975017 A2), referred to as [EP] in view of Machol (US 5,719,705), as applied above, in view of Lee et al. ("Inhomogeneous refractive index of SiOxFy thin films prepared by ion beam assisted deposition", referred to as [INH].

As described above [EP], teach a SiOxFy film with a protective silicon oxide film disposed thereon. EP teaches that the SiOxFy film is made by PECVD, and does not teach producing the layer through cathodic sputtering with simultaneous gas treatments of oxidation and a fluorinated gas. However, INH teach a method for producing a SiOxFy film, comprising IBAD of a silicon film , and simultaneously oxidizing the target and introducing a CF_4 gas into the chamber to turn the layer into a SiO_xF_y film. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the process of INH to form the SiO_xF_y film that is used by EP; because INH has shown that the process is a known method in the art for forming the material. INH go on to teach that the refractive index of the SiO_xF_y layers is 1.41 and 1.44, which overlaps the applicants claimed range of 1.38 to 1.44.

Claims 22-30, 33-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Machol et al. (U.S. 5,719,705), and INH, in view of EP.

Regarding claims 22-25, 28, 29, 33-39, 47-52, and 54-60, Machol et al. teach an antireflective coating on a transparent substrate such as an ophthalmic lens (col.1, lines 5-8). The antireflective coating comprises alternating layers of high and low refractive index materials. Machol teaches that the H.I. layer is the layer closest to the substrate and also teaches that any number of layers can be used for the anti reflective coating however, 3-12 layers is preferred (Machol et al., col. 3, lines 26-50). In a specific example shown in Table 1, Machol et al. teach an ARC that comprises 4 layers. A Hi/Li/Hi/Li, with respective thicknesses of 11.33nm/ 27.30nm/ 111.07nm/ 80.91nm. These ranges overlap the instantly claimed ranges. Machol et al. fail to teach that the last Li layer comprises a stabilized SiO_xF_y layer, with a silica protective layer thereon. However, INH teach a SiO_xF_y layer as described above, and goes on to teach that It would have been advantageous to use this layer in an antireflective coating because the low index silicon oxyfluoride thin films can reduce the number of high and low index multilayers and widen the bandwidth of multilayer high reflectors. Therefore it would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the SiO_xF_y layer as taught by INH in the antireflective coating of Machol et al. because INH teaches the many benefits encountered by the alternative use of the low refractive index material. Furthermore, a reduction in the number of high low index multilayers will result in a lower cost of production. Thus the refractive index would take on a thickness

of the outer Li as taught by Machol et al. to be 80.91 nm. The combination of INH and Machol fail to teach a protective layer of SiO_2 on top of the SiO_xF_y layer, however, EP teaches the use of a SiON and a SiO_2 layer up to 2000 nm as described above, to help with the out diffusion of fluorine from the SiO_xF_y layer, since the layer of SiO_2 layer is directly on top of the SiOF layer it is said to be protective. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use a silica and SiON layer on top of the SiO_xF_y layer in order to maintain the structural limitations of the underlying SiO_xF_y layer during processing and to prevent out diffusion of fluorine from the SiO_xF_y which will change the values of refractive index, and material properties of the SiO_xF_y layer. As discussed above, EP teaches PECVD as the deposition technique of the SiO_2 layer, however It would have been obvious to a person having ordinary skill in the art to utilize any known deposition method to deposit the metal oxide layer. Known deposition techniques taught by Machol, for metal oxide layers, were discussed above, and include IBAD with an ion gun, and sputtering a metal layer and then oxidizing the layer to obtain a metal oxide layer.

Regarding claims 26 and 27, Machol et al. teach utilizing an argon gas with the IBAD deposition (col. 8, lines 50-55).

Regarding claims 30 and 53, it is inherent, that the refractive index of the material at the given wavelength and time will be the same as instantly claimed, since the materials and thicknesses of the prior at and the instant application overlap.

Regarding claims 40-43 and 61-64, the prior art of record does not teach the specific combination of hi and low reflective layers, however, It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to utilize any amount of layers since Machol teaches up to 12 alternating layers. Depending upon the amount of reflectance desired it would have been obvious to vary the thicknesses of the subsequent layers based on the desired reflectance as is well known in the art. It would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the thicknesses of the layers for the desired reflectance, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 44-46 and 65-67, Machol et al teach that the antireflective coating is placed over a substrate. The substrate may comprise a laminated single version lenses each having a scratch resistant coating (Col. 8, lines 61-68). And in col. 3, lines 1-25, Machol et al. teach that the substrate may be an ophthalmic lens comprising an organic glass.

Claims 22, 26, and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jang et al. (US. 6,165,915).

Regarding claims 22, 26, 31, and 32, Jang (US 6,165,915) teaches that dense Silicon dioxide is known in the art to (1) impede diffusion of fluorine containing species from within the (SiOF) layer, and (2), impedes moisture into the (SiOF) layers, thus stabilizing the underlying SiOF layer (col. 7, lines 5-20).

Although Jang teaches PECVD as a preferred embodiment for depositing the barrier layer, Jang also teaches that the barrier layer may be formed by employing methods and materials as are conventional in the art of microelectronic fabrication (col. 6, lines 10-22). The applicant is put on official notice that ion assisted deposition and sputtering metals and converting to metal oxides are known deposition methods in the art of micro electronic device fabrication, also it is well known to use the deposition techniques set forth in instant claims 26, 31, and 32. Jang thus teaches that SiO is known to stabilize SiOF, and that a routineer in the art may experiment with other deposition techniques to achieve the stabilized SiOF layer, including sputtering and ion assisted deposition. Therefore it would have been obvious to a routineer in the art to experiment with sputtering and ion assisted deposition, of SiO on SiOF, in order to assimilate these techniques into existing fabrication sites.

Regarding claim 30, although Jang et al. is silent to the refractive index of the layer, it is inherent, that the refractive index of the material at the given wavelength and time will be the same, since the materials and thicknesses of EP and the instant application are similar.

Regarding claim 33, the stack as described above is formed on a semiconductor substrate and inherently has antireflective properties (abstract).

Claims 22-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Machol et al. (U.S. 5,719,705), and INH, in view of Jang (US 6,165,915) or Wang (US 6,511,923).

Regarding claims 22, 28, 29, 33-39, 47, 51, 52, and 54-60, Machol et al. teach an antireflective coating on a transparent substrate such as an ophthalmic lens (col.1, lines 5-8). The antireflective coating comprises alternating layers of high and low refractive index materials. Machol teaches that the H.I. layer is the layer closest to the substrate and also teaches that any number of layers can be used for the anti reflective coating however, 3-12 layers is preferred (Machol et al., col. 3, lines 26-50). In a specific example shown in Table 1, Machol et al. teach an ARC that comprises 4 layers. A Hi/Li/Hi/Li, with respective thicknesses of 11.33nm/ 27.30nm/ 111.07nm/ 80.91nm. These ranges overlap the instantly claimed ranges. Machol et al. fail to teach that the last Li layer comprises a stabilized SiO_xF_y layer, with a silica protective layer thereon.

INH teach a SiO_xF_y layer that is advantageous to use in an antireflective coating because the low index silicon oxyfluoride thin films can reduce the number of high and low index multilayers and widen the bandwidth of multilayer high reflectors (page 280, col. 2). Therefore it would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the SiO_xF_y layer as taught by INH in the antireflective coating of Machol et al. because INH teaches the many benefits encountered by the alternative use of the low refractive index material. Furthermore, a reduction in the number of high low index multilayers will result in a lower cost of production. Thus the refractive index would take on a thickness of the outer Li as taught by Machol et al. to be 80.91 nm, thus satisfying instant claims 28 and 29. The combination of INH and Machol fail to teach a protective layer of SiO_2 on top of the SiO_xF_y layer.

Jang teaches the use of a SiO_2 layer up to stabilize SiOF, and to help with the out diffusion of fluorine from the SiO_xF_y layer (col. 7, lines 5-15). Wang teaches a silicon oxide dielectric layer on SiOF in order to impede out diffusion, and to keep the SiOF layer stabilized (see at least col. 5, lines 5-50, and col. 6, line 56-col. 7, line 15). Since these layer of SiO_2 layer are directly on top of the SiOF layer it is said to be protective. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use a silica layer on top of the SiO_xF_y layer in order to maintain the structural limitations of the underlying SiO_xF_y layer during processing and to prevent out diffusion of fluorine from the SiO_xF_y which will change the values of refractive index, and material properties of the SiO_xF_y layer. Jang or Wang do not teach the specifically claimed deposition techniques for the SiO layer, however, since Wang and Jang teach that SiO stabilizes to some degree the SiOF layer, the deposition method of SiO is thereby considered trivial, and one of routine skill in the art would have found it obvious to utilize any known technique of depositing silicon oxide including sputtering, and ion assisted evaporation methods. Machol et al. teach that silicon dioxide layers can be deposited by many techniques known in the art. These techniques include CVD, IBAD, and sputtering, the sputtering technique may use a sputtered metal layer on a substrate and thereafter expose the metal layer to a reactive gas (e.g. oxygen), to form a metal oxide, other techniques include PECVD, and ion bombardment assisted deposition col. 6, line 50 – col. 7, lines 40). In regards to the article claim 47, the instantly claimed processes do not change the structure of the article. Since

Wang and Jang teach that SiO stabilizes SiOF to some degree the article thereby produced by the combination is said to read on the instant claims even though they do not specifically recite the instantly claimed processes. See the product by process case law presented above.

Regarding claims 23-25, and 48-50 Wang teaches that the protective silica layer has a thickness of less than 50 nms (col. 6, lines 7-12), which is sufficient to stabilize the SiOF layer. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to utilize this thickness range since it has been shown to be sufficient for protection, and by depositing thinner layers results in quicker production and lower costs.

Regarding claims 26 and 27, Machol et al. teach utilizing an argon gas with the IBAD deposition (col. 8, lines 50-55).

Regarding claims 30-32, and 53, INH teach a method for producing a SiOxFy film, comprising IBAD of a silicon film, and simultaneously oxidizing the target and introducing a CF_4 gas into the chamber to turn the layer into a SiO_xF_y film. It would have been obvious to a person having ordinary skill in the art at the time the present invention was made to use the process of INH to form the SiO_xF_y film that is to be obviously used in Machol, because INH has shown that the process is a known method in the art for forming the material. INH go on to teach that the refractive index of the SiO_xF_y layers is 1.41 and 1.44, which overlaps the applicants claimed range of 1.38 to 1.44.

Regarding claims 40-43 and 61-64, the prior art of record does not teach the specific combination of hi and low reflective layers, however, It would have

been obvious to a person having ordinary skill in the art at the time the present invention was made to utilize any amount of layers since Machol teaches up to 12 alternating layers. Depending upon the amount of reflectance desired it would have been obvious to vary the thicknesses of the subsequent layers based on the desired reflectance as is well known in the art. It would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the thicknesses of the layers for the desired reflectance, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 44-46 and 65-67, Machol et al teach that the antireflective coating is placed over a substrate. The substrate may comprise a laminated single version lenses each having a scratch resistant coating (Col. 8, lines 61-68). And in col. 3, lines 1-25, Machol et al. teach that the substrate may be an ophthalmic lens comprising an organic glass.

Response to Arguments

The applicant showed possession of the "ion gun" limitation, and therefore the rejections over 112 1st have been removed.

The applicant's amendments to claims 40 and 61 have alleviated the 112 2nd rejections.

A new 112 rejection against the definition of "stabilized" has been brought up in this office action. It is unclear to what degree "stabilized" encompasses and what the definition of "stabilized" entails.

In response to the applicants argue that PECVD and other deposition techniques as described by Machol do not lead to stabilized SiOF layers. The applicants provided a declaration from Scherer, who argues that the deposition of SiO on a SiOF layer without ion assistance results in unstabilized SiOF. These results being summarized in a table located in the results section. The Applicant asserts that a refractive index of 1.458 after 1 month up from 1.4 is not "stabilized". The applicant has never defined "stabilized". The declaration is deficient in that it is unclear as to what degree stabilization entails. Is stabilization something measured by refractive index and time? Is the applicant stating to be "stabilized" is it well known that the refractive index should be unchanged for several months? Clarification on to what degree the instant claimed "stabilized" entails is needed. Furthermore, in the declaration Scherer teaches that the SiOF layer is deposited by ion assisted deposition as well, which in the instant specification, is not recommended. Are the SiOF layers of examples 2 and 4-6, and 7, of the instant specification, deposited by ion assisted deposition? Or can this unstabilization as shown in comparative example B of the declaration, be attributed to the ion assisted deposition of SiOF.

Furthermore, the applicant has not shown that PECVD techniques of Silica as taught by EP result in unstabilized SiOF. Based on other teachings in the art, it seems that SiO regardless of the deposition technique results in some degree of "stabilization" of an underlying SiOF layer. The applicant is invited by the Examiner to define "stabilization" and to show how EP's PECVD of SiO does not teach "stabilization" of SiOF.

The applicant argues that there is no relationship either in the cited art references or in common general knowledge between the deposition technique of the SiO2 layer and its ability to protect an underlying SiOF layer from fluorine out diffusion. This unpredictable relationship was discovered by the present inventors. Choosing an appropriate deposition for the SiO protective layer on SiOF is not predictable.

The applicants argue that "for a routineer to try any known technique of deposition, there must be a reasonable expectation of success, and there must also be a finding that choosing the appropriate deposition technique is a potential solution to the stabilization problem.

Jang (US 6,165,915) teaches that dense Silicon dioxide is known in the art to (1) impede diffusion of fluorine containing species from within the (SiOF) layer, and (2), impedes moisture into the (SiOF) layers, thus stabilizing the underlying SiOF layer (col. 7, lines 5-20). Although Jang teaches PECVD as a preferred embodiment for depositing the barrier layer, Jang also teaches that the barrier layer may be formed by employing methods and materials as are conventional in the art of microelectronic fabrication (col. 6, lines 10-22). The applicant is put on official notice that ion assisted deposition and sputtering metals and converting to metal oxides are known deposition methods in the art of micro electronic device fabrication. Jang thus teaches that SiO is known to stabilize SiOF, and that a routineer in the art may experiment with other deposition techniques to achieve the stabilized SiOF layer.

Thereby it is the examiners position that according to Jang, silica is known to stabilize SiOF, and that known deposition methods in the art of microelectronic device fabrication (i.e. ion assisted, and sputtering), are within the knowledge and skill of a routineer in the art to achieve a stabilized SiOF film.

Other teachings in the art of protective SiO layers on SiOF films are also seen in Wang (US 6,511,923). Wang teaches a first dielectric layer comprising fluorine doped silica (SIOF) (col. 5, lines 5-20). The SiOF layer then has a second dielectric layer formed thereon. The second dielectric layer serves to protect the first layer. "The deposition of the second dielectric layer on the first dielectric layer results in improved stability and immunity to moisture absorption for the composite insulating layer" (col. 6, lines 60-67). The second layer makes it possible to increase the dopant content such as the fluorine content in the first layer to further lower the dielectric constant of the first dielectric layer without introducing additional instability concerns. And the end result is a stable first dielectric film (col. 7, lines 5-15). The second dielectric layer is silicon oxide (col. 5 lines 45-50). The thickness of the second dielectric layer is preferably 5-20 nms because of the higher dielectric constant of the second dielectric layer (col. 6, lines 7-12).

Therefore there is motivation in the art, as evidenced by Jang, and Wang to use SiO as a protective layer on a SIOF layer in order to provide a stabilized SiOF. As discussed by Jang, there is motivation in the art to try other deposition techniques that are known in the art. Thereby showing those skilled in the art that there is a reason to believe that modifying EP with the deposition techniques

in Machol (sputtering and ion assisted deposition) would work. And also that those skilled in the art had a reason to replace the PECVD technique cited n LEE with evaporation under ion assistance or sputtering.

Since Wang and Jang teach that SiO stabilizes to some degree the SiOF layer, the deposition method of SiO is thereby considered trivial, and one of routine skill in the art would have found it obvious to utilize any known technique of depositing silicon oxide including sputtering, and ion assisted evaporation methods.

The applicants argue that EP teaches away from the claimed invention, by EP teaching that fluorine itself will diffuse well into silicon dioxide films. The applicants then state that EP fails to transform a SiO2 layer which is permeable to fluorinated substances into a protective layer impermeable to fluorinated substances. Rather EP teaches to use SiON protective layer to achieve this result. This argument is not commensurate with the scope of the claim. EP teaches a stabilized SiOF, with a SiO layer thereon. The SiO film is inherently protective since it covers the underlying SiOF layer. No where in the claim does it state that the SiO film must stabilize the SiOF layer and be impermeable to fluorinated substances. Furthermore, Wang and Jang teach that SiO is useful in stabilizing SiOF, contrary to EP's teachings, and therefore it is said that the SiO layer of EP does in fact act as a stabilizing material in the structure.

The applicants argue the combination of EP with INH and Machol. The applicants argue that Machol teaches only alternating Hi and Low refractive index

materials. And that by placing Silica on top SiOF would be placing a Low on a low refractive index. However, the motivation of placing the silica and SiON upon the SiOF layer as explained by the examiner is to provide protection to the underlying SIOF, and to stabilize the layer. The silica layer of EP is taught to be of a small thickness and therefore inherently does not interfere with the reflective properties of the underlying stack.

The applicants also argue that, there is no motivation to replace the PECVD of Lee with ion assistance or sputtering disclosed by Machol and that there is no motivation to believe such modification would work. Applicants also argue that the combination is based on hindsight. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).
It is the examiner's position that the combination of EP with Machol is not based on hindsight but rather the disclosure in Machol itself that it is well known to deposit silicon dioxide layers by any technique and which further discloses the equivalence and interchangeability of using CVD as disclosed by EP with using IBAD or sputtering as presently claimed. Given this teaching one would have a

reasonable expectation when using IBAD or sputtering in EP. Therefore, absent evidence to the contrary, it would have been obvious to one of ordinary skill in the art to use IBAD or sputtering as the deposition technique in EP.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN C. LANGMAN whose telephone number is (571)272-4811. The examiner can normally be reached on Mon-Thurs 6:30 am - 4:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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JCL

/Callie E. Shosho/
Supervisory Patent Examiner, Art Unit 1794